23 Oct 2001--Revised
Drought and Reservoir Status—Wilmington District

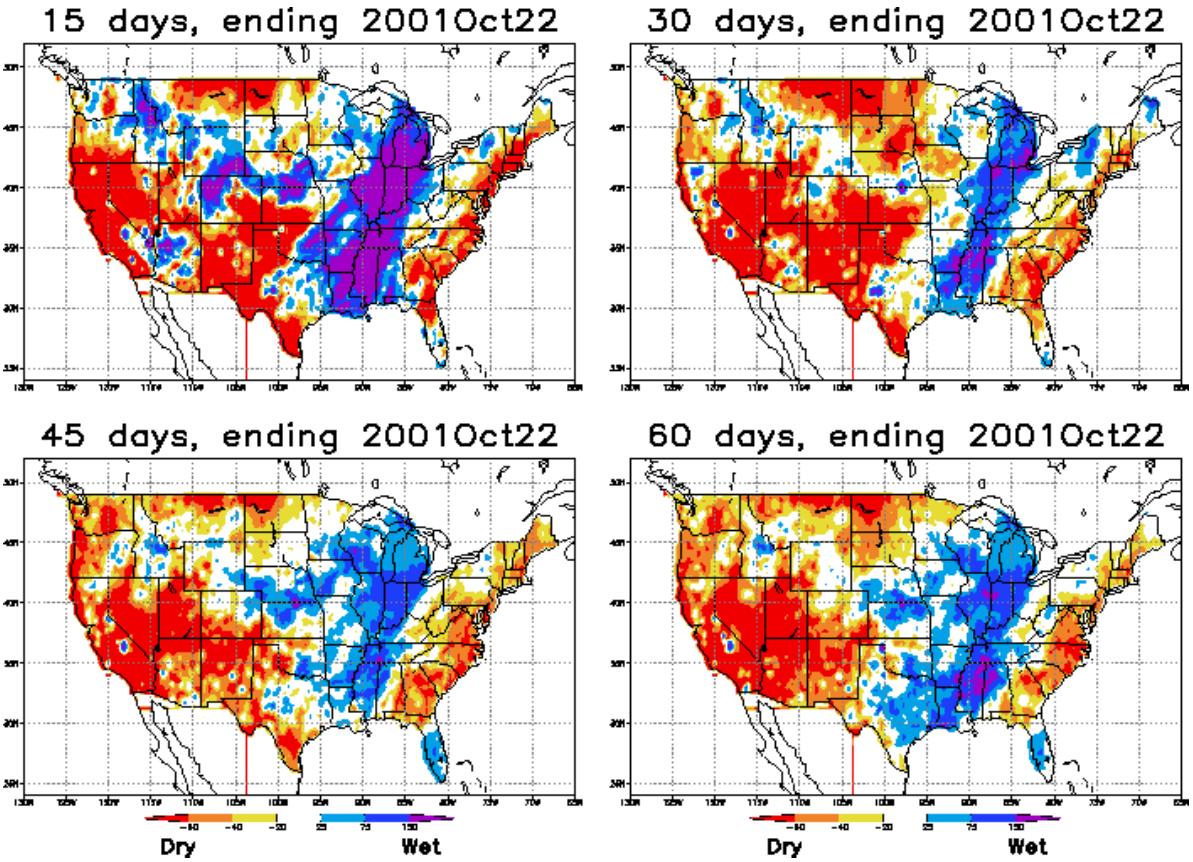
1. **Purpose of this report**: This is a status report on drought and reservoir conditions in the Wilmington District, U.S. Army Corps of Engineers. Specifically, this report will present past and current watershed rainfall and reservoir inflows in both tabular and graphical formats and discuss the current status and future operation of the five reservoir projects operated by the Wilmington District. The Corps projects are: John H. Kerr Dam and Reservoir project located on the Roanoke River, North Carolina and Virginia; Philpott Lake project located on the Smith River in the Roanoke River Basin, Virginia; B. Everett Jordan Dam and Lake project located on the Haw River in the Cape Fear River Basin, North Carolina; W. Kerr Scott Dam and Reservoir project located on the Yadkin River in the Yadkin-Pee Dee River Basin, North Carolina; and Falls Lake project located on the Neuse River in the Neuse River Basin, North Carolina. In general, the Philpott and John H. Kerr projects are in a significant drought status and the W. Kerr Scott, Falls and B. Everett Jordan projects are in a mild drought. A summary table for these projects is found below.

Table One—Wilmington District Reservoir Project Status

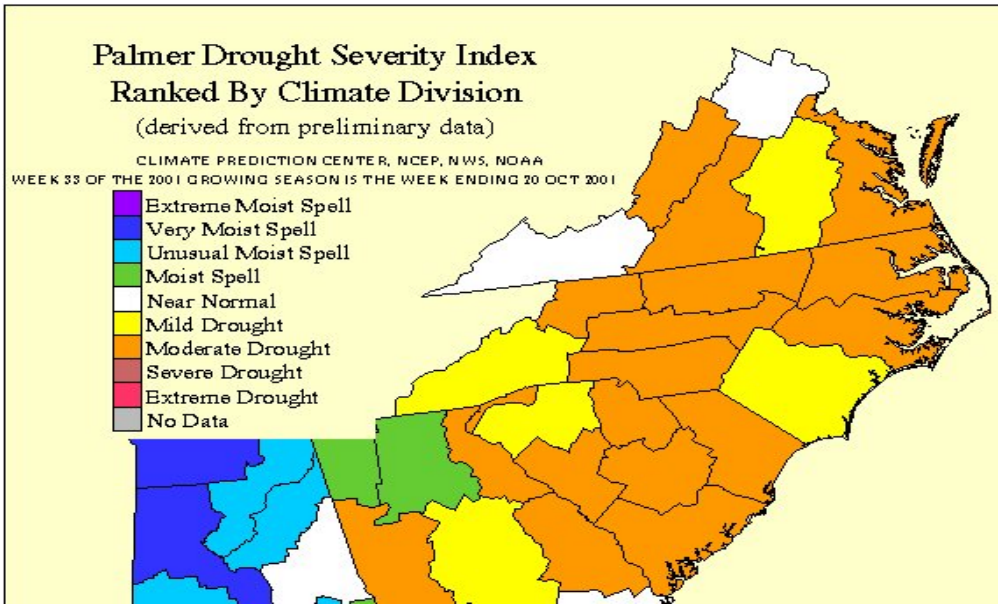
Reservoir	Current Level (feet-msl)	Guide Curve Level (feet-msl)	Trend or Status
John H. Kerr	292.76	298.1	Kerr Reservoir is 5.3 feet below guide curve, is now below the dependable capacity level of 293 and continues a slow fall. Heavy impacts occur to recreation at this level and hydropower plant capacity is impacted.
Philpott	966.01	971.5	Philpott Lake is 5.5 feet below the guide curve and falling slowly. Recreational impacts will increase as the level falls.
B. Everett Jordan	214.51	216.0	Jordan Lake is 1.5 feet below normal and is falling slowly.
Falls Lake	249.54	251.5	Falls Lake is 2.0 feet below normal and is falling slowly.
W. Kerr Scott	1027.66	1030.0	W. Kerr Scott Lake is 2.3 feet below normal and falling slowly.

2. **Rainfall Status**: The four panel plot on the following page shows the total rainfall observed in 15 day intervals for the entire United States with data through 22 October 2001. The four panels generally illustrate that both North Carolina and Virginia have received below average rainfall over this 60 day period. Recently, the rainfall deficit in some areas of North Carolina and Virginia has been temporarily relieved by rains from a quickly moving frontal system. This is illustrated in the first 15 day panel. However, the reservoir inflow and rainfall information presented later in this report will demonstrate that an extended time of above average rainfall

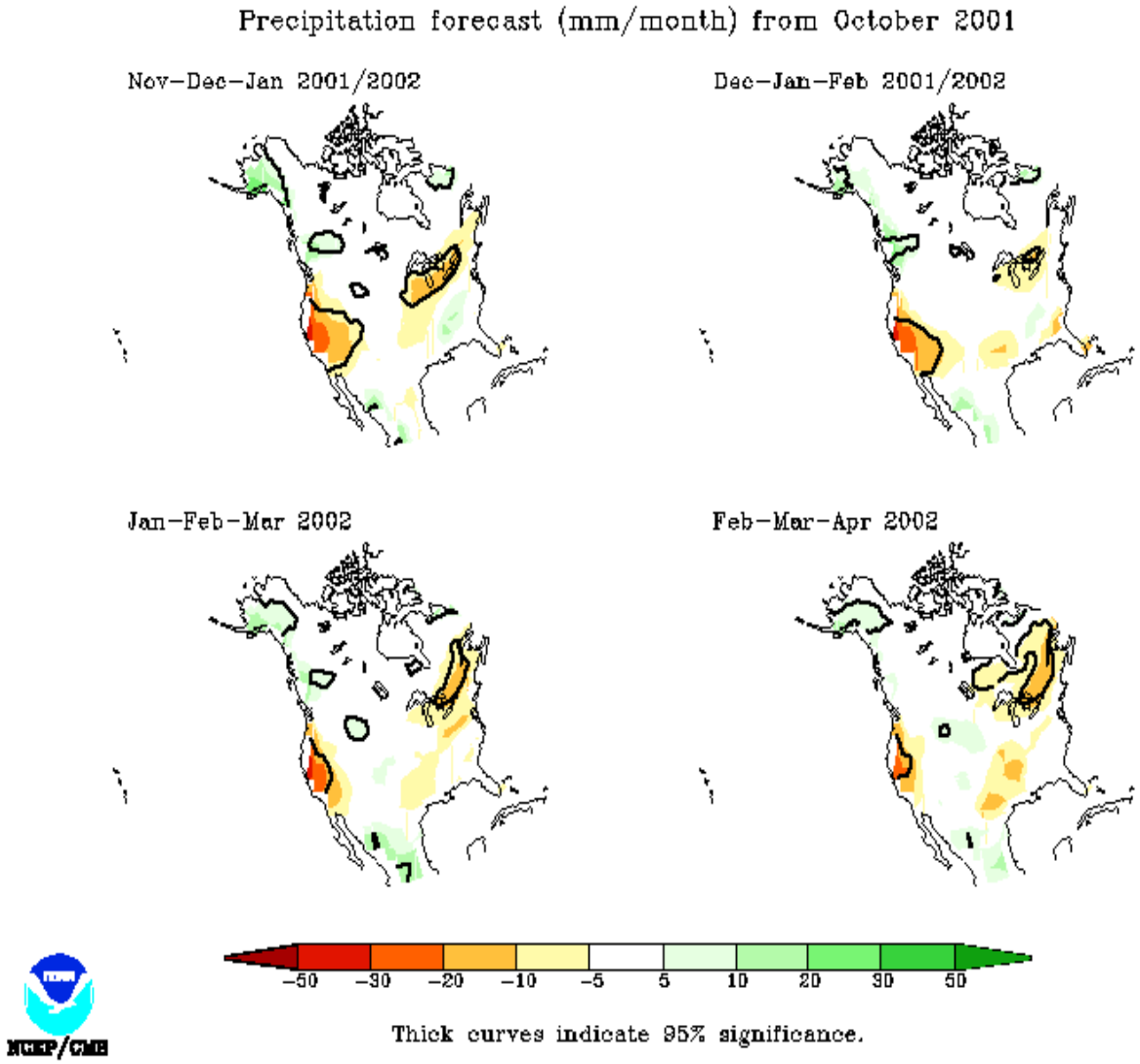
over several months is needed to reverse the drought conditions, replenish the water tables and restore the stream flow and reservoir levels.



3. **Palmer Drought Index:** The Palmer Drought severity index is illustrated further below and shows the majority of Virginia and North Carolina to be in a mild to moderate drought.

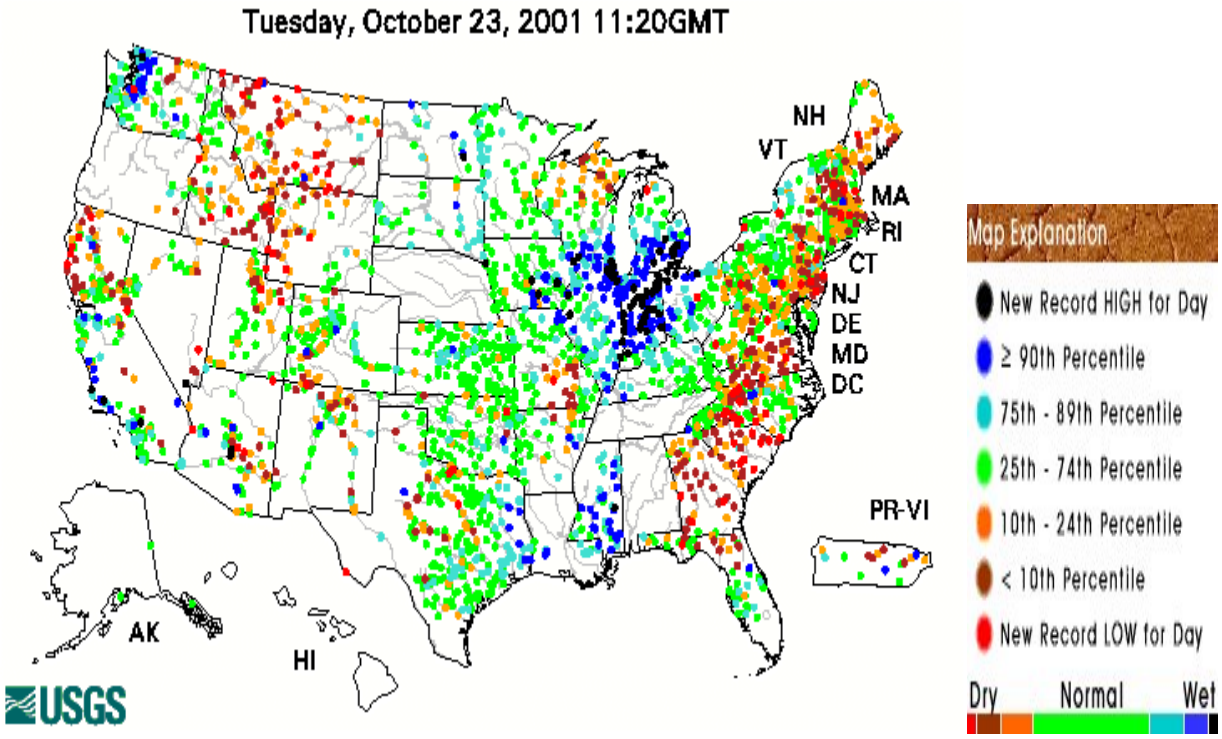


4. **Forecast Precipitation:** The latest long term rainfall forecast from the Climate Modeling Branch of the National Oceanic and Atmospheric Administration (NOAA) is shown below. In general for the North Carolina and Virginia areas, near normal rainfall conditions are expected over the next few months. However, the areas bordering both states are forecast to receive below average rainfall and a slight shift in conditions could change this forecast. This official forecast is used to estimate future inflows and projected lake levels shown later in this report.



5. **River and Stream Flow Conditions**: The points on the map shown on the following page are the locations of stream gages maintained by the U.S. Geological Survey. The meaning of the individual points are shown in the legend located to the right of the map. If a location does not have a color associated with it, then the station's status is unranked. As shown on the map, river and stream flow conditions can vary abruptly from location to location and illustrate the orographic effects of the Appalachian mountain chain. The stream gage locations west of the Appalachian mountain chain are shown predominately as 25 to greater than 90 percentile gages

and reflect an abundance of rains that have recently occurred in Alabama, western Georgia, Tennessee, Kentucky, extreme western Virginia, and West Virginia. Stream gages showing flows less than 24 percentile are typically shown on the eastern side of the Appalachians. This demonstrates that the higher mountains can strip the moisture from rain clouds as they travel from west to east. Specifically, the Smith River watershed upstream of Philpott Dam in south-western Virginia and the Roanoke River watershed above Kerr Dam in south central Virginia has incoming streams that are in the 24th flow percentile AND lower. The W. Kerr Scott area is borderline normal (25th to 74th percentile) to below normal conditions. The Haw River watershed above B. Everett Jordan Dam and the Neuse River watershed above Falls Dam are also in borderline areas. A table of rainfall and reservoir inflows to Wilmington District dams over the past 41 months is included later in this report.



6. **<u>Tabulated Philpott Watershed Rainfall and Inflows</u>**. From June 1998 to mid-October 2001, only nine out of these 41 months have had above normal rainfall. The remaining months have had rainfall typically averaging from 30 to 70 percent of normal. One month (October 2000) had no rainfall. None of the previous 41 months had inflows at or above normal. All were below normal. Basically, the past few weeks have had inflows running less than 20 percent of normal. **Over the past 41 months, average rainfall in the Philpott watershed has averaged about 1.2 inches below normal per month.** With this deficit, inflows to Philpott Dam over the past 41 months has averaged 44 percent of normal. Table two on the next page tabulates the monthly average inflow and total watershed rainfall since drought conditions began.

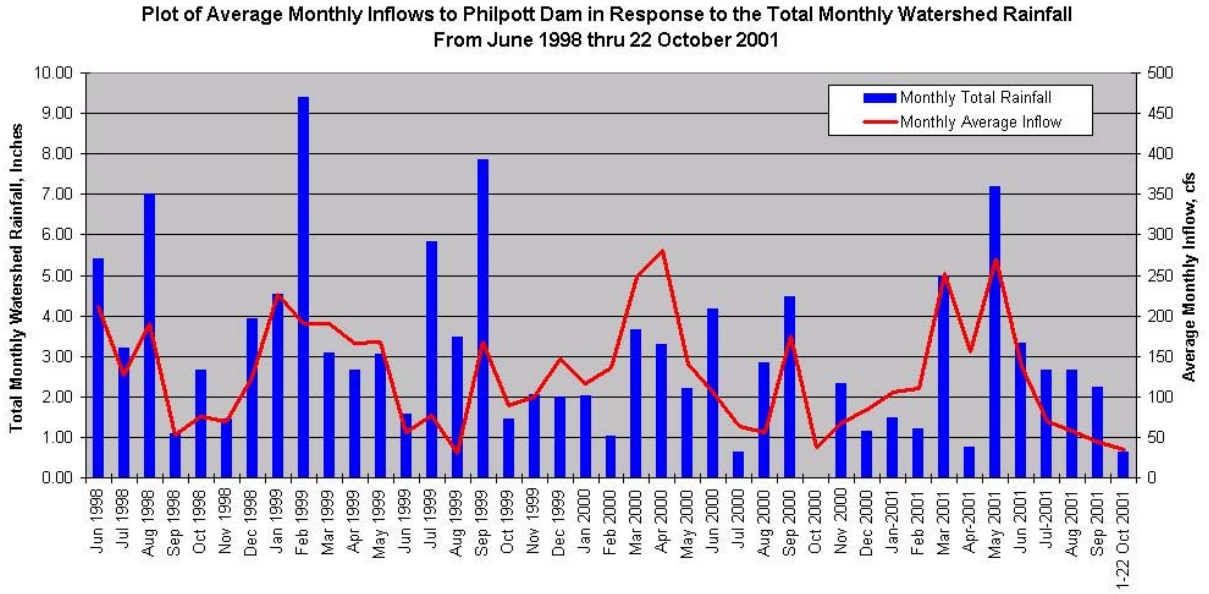
Table Two

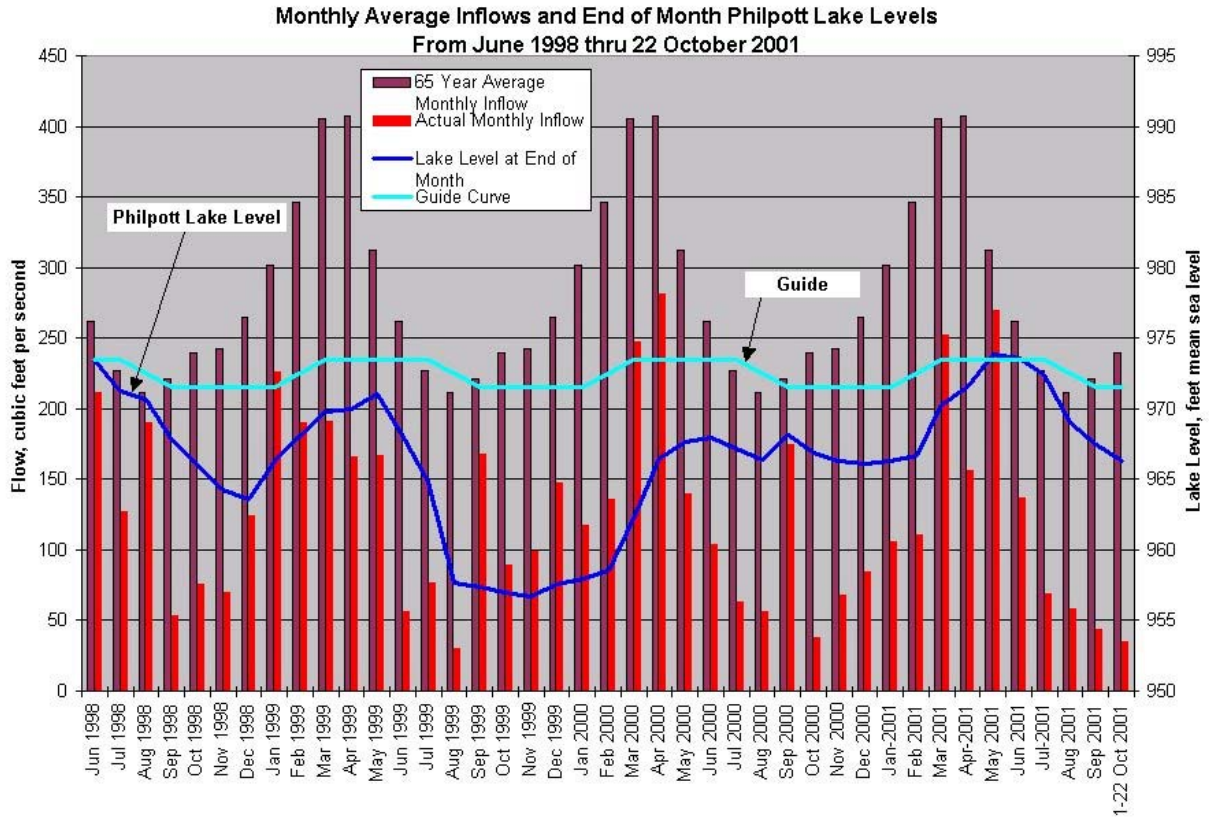
Philpott Lake--Inflows, Rainfall, and Lake Levels From June 1988 to Present

	Inflow to Philpott			Watershed Rainfall			Lake Level	Guide Lvl
	Long Term Avg	Actual	Percent of Normal	Long Term Avg	Actual	Percent of Normal	at End of Period Ft, msl	at End of Period Ft, msl
Jun 1998	262	211	80.5	4.67	5.41	115.8	973.47	973.5
Jul 1998	227	127	55.9	5.22	3.19	61.1	971.28	973.5
Aug 1998	211	190	90.0	4.68	7.02	150.0	970.67	972.5
Sep 1998	221	53	24.0	4.74	1.09	23.0	967.71	971.5
Oct 1998	240	76	31.7	4.13	2.66	64.4	966.11	971.5
Nov 1998	242	70	28.9	3.48	1.45	41.7	964.26	971.5
Dec 1998	265	124	46.8	3.61	3.93	108.9	963.53	971.5
Jan 1999	302	226	74.8	3.68	4.53	123.1	966.31	971.5
Feb 1999	346	190	54.9	3.51	9.40	267.8	968.06	972.5
Mar 1999	405	191	47.2	4.61	3.07	66.6	969.77	973.5
Apr 1999	407	166	40.8	4.12	2.65	64.3	970.00	973.5
May 1999	312	167	53.5	4.68	3.06	65.4	971.06	973.5
Jun 1999	262	56	21.4	4.67	1.58	33.8	968.18	973.5
Jul 1999	227	77	33.9	5.22	5.84	111.9	964.86	973.5
Aug 1999	211	30	14.2	4.68	3.46	73.9	957.68	972.5
Sep 1999	221	168	76.0	4.74	7.85	165.6	957.41	971.5
Oct 1999	240	89	37.1	4.13	1.45	35.1	957.03	971.5
Nov 1999	242	99	40.9	3.48	2.06	59.2	956.66	971.5
Dec 1999	265	147	55.5	3.61	2.00	55.4	957.61	971.5
Jan 2000	302	117	38.7	3.68	2.01	54.6	957.93	971.5
Feb 2000	346	136	39.3	3.51	1.03	29.3	958.53	972.5
Mar 2000	405	247	61.0	4.61	3.65	79.2	962.25	973.5
Apr 2000	407	281	69.0	4.12	3.30	80.1	966.47	973.5
May 2000	312	140	44.9	4.68	2.21	47.2	967.67	973.5
Jun 2000	262	104	39.7	4.67	4.16	89.1	967.90	973.5
Jul 2000	227	63	27.8	5.22	0.62	11.9	967.21	973.5
Aug 2000	211	56	26.5	4.68	2.85	60.9	966.36	972.5
Sep 2000	221	175	79.2	4.74	4.48	94.5	968.16	971.5
Oct 2000	240	38	15.8	4.13	0.00	0.0	966.91	971.5
Nov 2000	242	68	28.1	3.48	2.32	66.7	966.33	971.5
Dec 2000	265	84	31.7	3.61	1.16	32.1	966.07	971.5
Jan 2001	302	106	35.1	3.68	1.47	39.9	966.30	971.5
Feb 2001	346	111	32.1	3.51	1.22	34.8	966.67	972.5
Mar 2001	405	252	62.2	4.61	4.99	108.2	970.23	973.5
Apr 2001	407	156	38.3	4.12	0.77	18.7	971.56	973.5
May 2001	312	270	86.5	4.68	7.19	153.6	973.83	973.5
Jun 2001	262	137	52.3	4.67	3.31	70.9	973.60	973.5
Jul 2001	227	69	30.4	5.22	2.67	51.1	972.36	973.5
Aug 2001	211	58	27.5	4.68	2.66	56.8	969.02	972.5
Sep 2001	221	44	19.9	4.74	2.24	47.3	967.42	971.5
1-22 Oct 2001	240	35	14.6	4.13	0.62	15.0	966.01	971.5
Average	280	127	44.1	4.26	3.09	71.4		

7. **Plotted Philpott Project Watershed Rainfall, Project Inflows and End of Month Lake Level**. The following plots illustrate the data in Table Two and the relationship between rainfall, resultant net inflow to Philpott Dam and the end of month Philpott Lake levels. There are no

surprises in either plot. As expected, inflows and lake levels increase when rainfall increases and declines upon continued low rainfall conditions.





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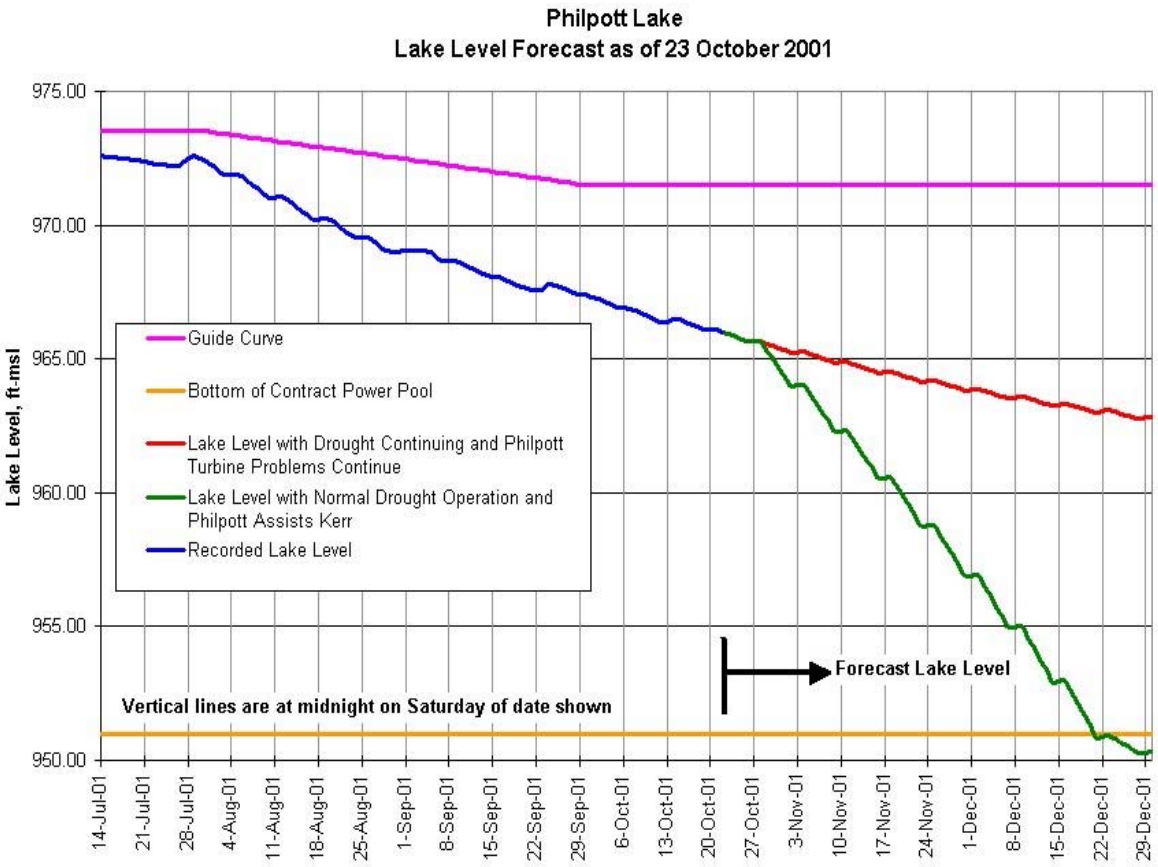
8. **Status of Philpott Lake**: Concerns over the reliability of the turbines in Philpott Dam continue. Both turbines are over 50 years old. One turbine is currently online but operating at a reduced load. The other turbine is offline and undergoing maintenance. As a result of these problems, the Kerr Powerhouse has been generating some of the contract energy that Philpott would normally provide. Typically, Philpott would be generating eight hours a day at 15 megawatts capacity with any extra generation above contract minimum generation assisting Kerr when the Kerr Reservoir level falls to a very low level or below the interchange level. A potential alternative will be to run the online Philpott turbine at reduced capacity for up to 17 to 18 hours per day. This would allow some of Kerr's minimum contract generation to be produced at Philpott, release extra water from Philpott in the process and boost the inflows to Kerr by a small amount. The online turbine is being currently evaluated for extended generation time. A decision on this issue will be made next week. The other alternative would be to continue the same path with Kerr assisting Philpott as has been done over the past few weeks. The plot below shows both scenarios. One forecast level illustrated by the red line assumes that the turbine problems at Philpott continue, the drought management directives for both projects cannot be implemented and Kerr continues to generate some of Philpott contract energy. The other forecast level shown by the green line shows Philpott assisting Kerr by generating part of Kerr's contract energy in accordance with the drought management directives with a resulting sharp drop in the Philpott Lake level. Table two below documents the levels of impacts in Philpott Lake.



9. **Recreation Status of Philpott Lake**: Table three below tabulates the levels of bottom of boat ramp elevations at Philpott Lake. The lake elevation should be at least three feet higher than the bottom of ramp elevation for the ramp to be useable. As can be derived from the table, boat-ramp access to the lake becomes increasingly limited below pool elevation 960 feet, msl.

Table Three
Public Boat Ramps at Philpott Lake

Location	Number Of Lanes	Bottom Ramp Elevation (feet, m.s.l.)
Philpott Park	3	953
	1	948
Bowens Creek	2	953
Goose Point	1	953
Salthouse Branch	1	967
	2	957
Twinridge Marina	2	954
Horseshoe Point	2	953
Jamison Mill	1	962
Ryans Branch	2	955
Runnett Bag	1	960

10. **Tabulated John H. Kerr Dam Watershed Rainfall and Inflows**. Since June 1998, only 10 out of the past 41 months had above average rainfall. As with the inflow trend at the Philpott project, only three of the past 41 months had average monthly inflows greater than average. The past 16 months have had inflows below normal. Over the past 41 months, inflows overall trended about 60 percent of average although rainfall has averaged 83 percent of normal. **However, inflows to Kerr Reservoir over the past two months have averaged less than 25 percent of normal.** Table four shown below tabulates this information.

Table Four
John H. Kerr--Inflows, Rainfall, and Lake Levels From June 1998 to Present

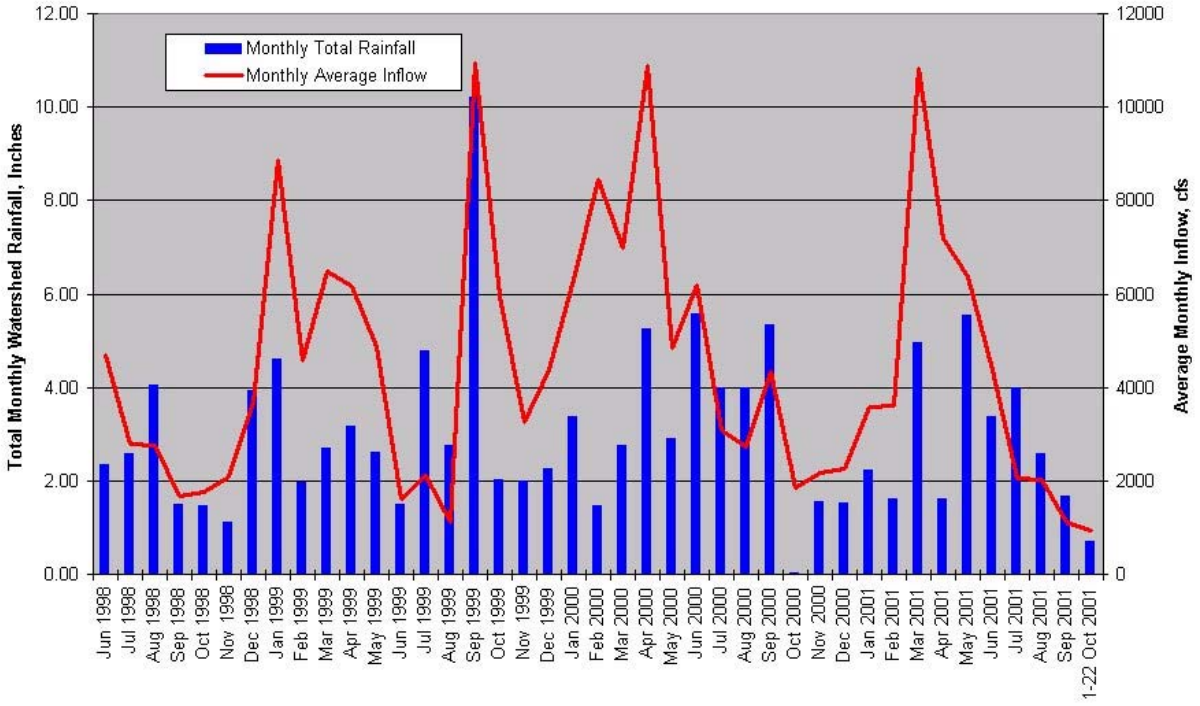
	Inflow to Kerr Dam			Watershed Rainfall			Lake Level End of Month Ft-msl	Guide Level End of Month Ft-msl
	Long Term Avg	Actual	Percent of Normal	Long Term Avg	Actual	Percent of Normal		
Jun 1998	5822	4680	80	3.80	2.34	62	298.69	299.50
Jul 1998	5253	2779	53	4.46	2.58	58	296.50	299.50
Aug 1998	5128	2769	54	4.19	4.06	97	296.29	299.50
Sep 1998	4738	1685	36	3.53	1.50	42	294.93	299.50
Oct 1998	5070	1755	35	3.19	1.48	46	294.60	297.50
Nov 1998	5474	2085	38	2.79	1.12	40	294.68	295.50
Dec 1998	7394	3671	50	3.25	3.94	121	296.48	295.50
Jan 1999	10316	8866	86	3.36	4.62	138	298.69	295.50
Feb 1999	11618	4569	39	3.27	1.97	60	295.49	295.50
Mar 1999	13019	6485	50	3.81	2.70	71	300.75	301.00
Apr 1999	11031	6154	56	3.42	3.16	92	301.68	302.00
May 1999	7656	4882	64	3.90	2.60	67	300.86	302.00
Jun 1999	5822	1610	28	3.80	1.51	40	298.69	299.50

Table Four (Continued)
John H. Kerr--Inflows, Rainfall, and Lake Levels From June 1998 to Present

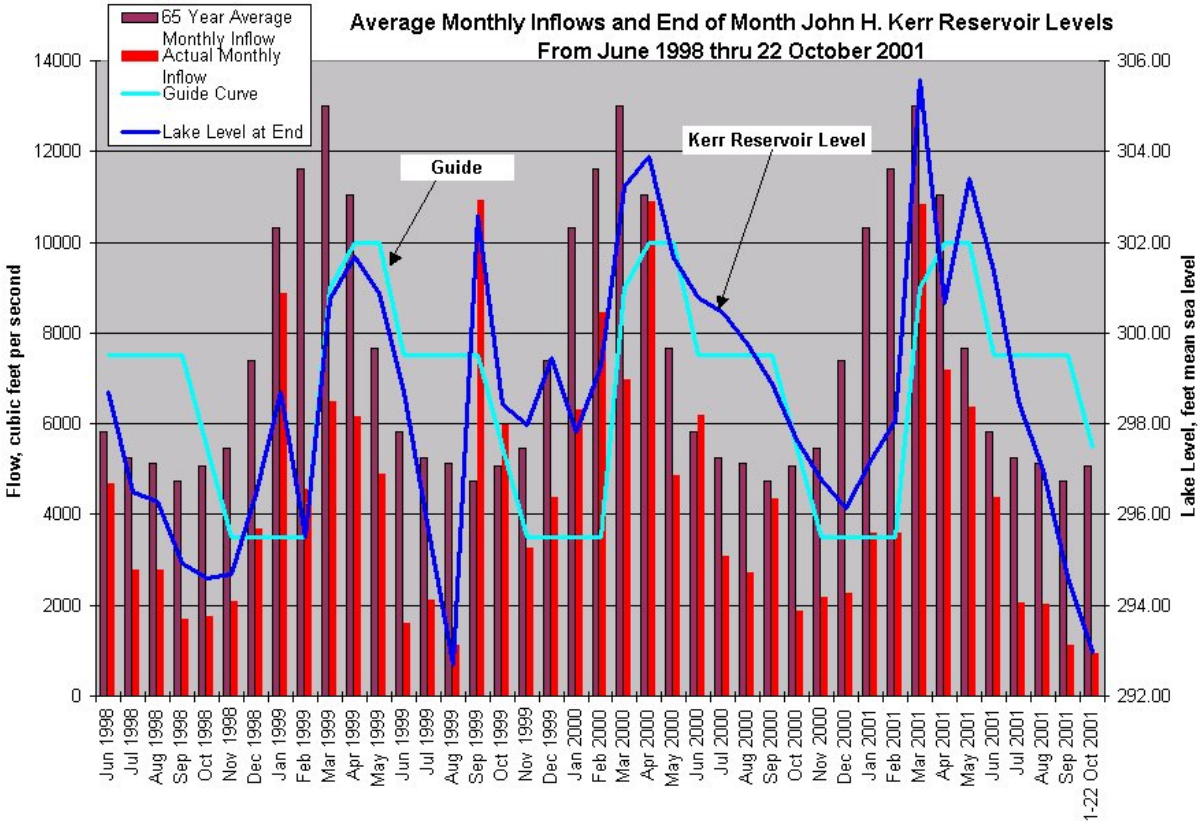
	Inflow to Kerr Dam			Watershed Rainfall			Lake Level End of Month Ft-msl	Guide Level End of Month Ft-msl
	Long Term Avg	Actual	Percent of Normal	Long Term Avg	Actual	Percent of Normal		
Jul 1999	5253	2100	40	4.46	4.79	107	295.64	299.50
Aug 1999	5128	1112	22	4.19	2.77	66	292.70	299.50
Sep 1999	4738	10931	231	3.53	10.21	289	302.60	299.50
Oct 1999	5070	5965	118	3.19	2.02	63	298.42	297.50
Nov 1999	5474	3258	60	2.79	1.99	71	297.96	295.50
Dec 1999	7394	4381	59	3.25	2.27	70	299.45	295.50
Jan 2000	10316	6318	61	3.36	3.36	100	297.82	295.50
Feb 2000	11618	8437	73	3.27	1.47	45	299.26	295.50
Mar 2000	13019	6972	54	3.81	2.75	72	303.23	301.00
Apr 2000	11031	10890	99	3.42	5.25	154	303.90	302.00
May 2000	7656	4848	63	3.90	2.90	74	301.66	302.00
Jun 2000	5822	6182	106	3.80	5.57	147	300.78	299.50
Jul 2000	5253	3085	59	4.46	3.99	89	300.46	299.50
Aug 2000	5128	2717	53	4.19	3.98	95	299.74	299.50
Sep 2000	4738	4353	92	3.53	5.33	151	298.88	299.50
Oct 2000	5070	1861	37	3.19	0.03	1	297.65	297.50
Nov 2000	5474	2171	40	2.79	1.56	56	296.77	295.50
Dec 2000	7394	2253	30	3.25	1.53	47	296.14	295.50
Jan 2001	10316	3588	35	3.36	2.23	66	297.19	295.50
Feb 2001	11618	3598	31	3.27	1.62	50	298.06	295.50
Mar 2001	13019	10827	83	3.81	4.97	130	305.58	301.00
Apr 2001	11031	7192	65	3.42	1.61	47	300.66	302.00
May 2001	7656	6367	83	3.90	5.54	142	303.42	302.00
Jun 2001	5822	4375	75	3.80	3.37	89	301.36	299.50
Jul 2001	5253	2054	39	4.46	3.98	89	298.48	299.50
Aug 2001	5128	2034	40	4.19	2.57	61	296.97	299.50
Sep 2001	4738	1123	24	3.53	1.67	47	294.64	299.50
1-22 Oct 2001	5070	931	18	3.19	0.71	22	292.76	297.50
Average	7404	4437	60	3.57	3.02	82		

11. **Plotted John H. Kerr Project Watershed Rainfall, Project Inflows and End of Month Lake Level**. The plots on the following page illustrate the data in Table Four and the relationship between rainfall, resultant net inflow to Kerr Dam and the end of month Kerr Reservoir levels. The second plot greatly illustrates the magnitude of actual inflows over the past few months compared with typical inflows and the resulting rapidly falling lake level.

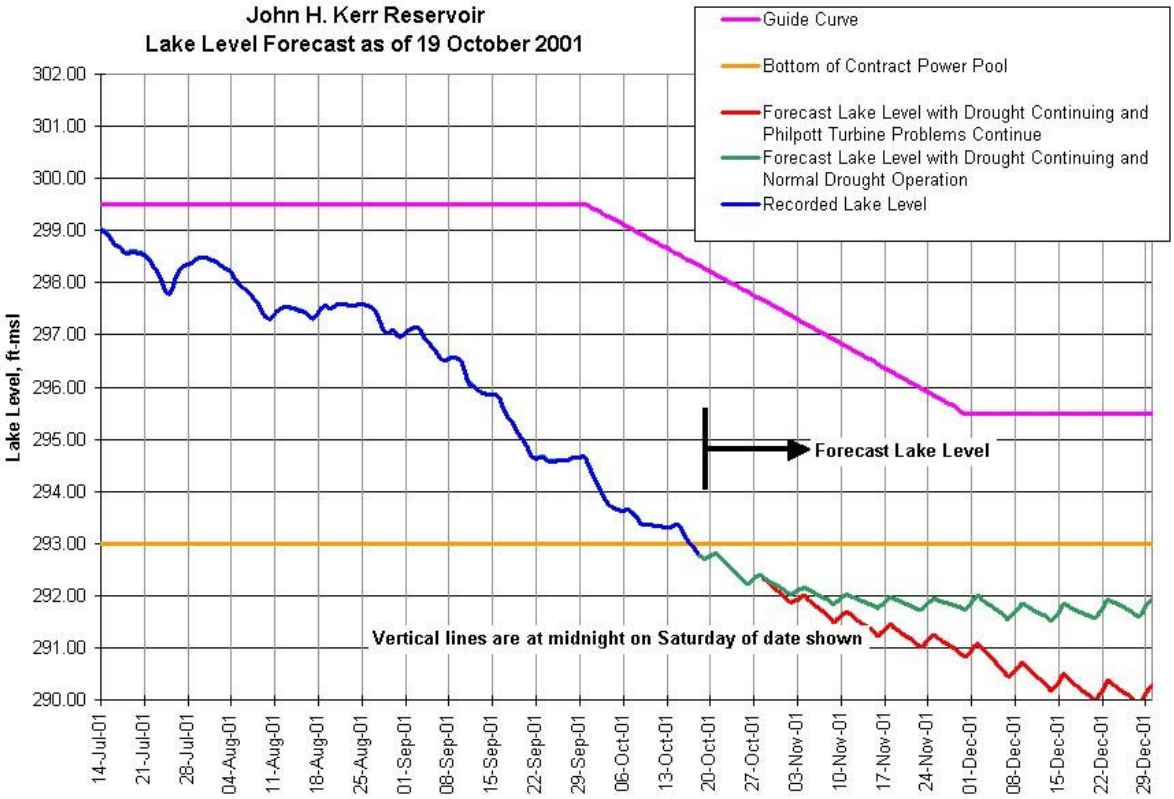
Plot of Average Monthly Inflows to John H. Kerr Dam in Response to the Total Monthly Watershed Rainfall From June 1998 thru 22 October 2001



Average Monthly Inflows and End of Month John H. Kerr Reservoir Levels From June 1998 thru 22 October 2001



12. **Status of Kerr Reservoir**: Conditions continue to get progressively worse at Kerr Dam. As of this report, Kerr Reservoir is at 292.8 feet, msl or 5.5 feet below a dropping guide curve and is below the dependable capacity curve. As with the discussion earlier on Philpott, the forecast level of Kerr Reservoir shows two potential futures. The red line in the plot below shows Kerr continuing to assist Philpott in generating part of Philpott's minimum contract generation in addition to the minimum contract generation for Kerr. This is done in response to assumed continued turbine problems at the Philpott powerhouse. The green line illustrates the other possible future and reflects a normal response to drought conditions with Philpott assisting Kerr. This latter possibility still has the projected level of Kerr Reservoir staying below the 293 level and as a result, Kerr fails to maintain the dependable capacity condition in the power plant of 225 megawatts. This may have financial implications to hydropower generation revenues fed into the Federal treasury and to the Southeastern Power Administration if energy has to be purchased to supply the electric needs of preference customers.



13. Impacts to Public Recreation Facilities at Kerr Reservoir. Public recreation facilities at John H. Kerr Dam and Reservoir include approximately 62 boat-ramp lanes and 41 swimming beaches (13 Corps, 10 State, 18 other). Draw down of the reservoir reduces the usable surface area, and can render boat ramps and swimming areas unusable. Table five below shows the bottom of ramp elevation of the public boat ramps at John H. Kerr. The reservoir elevation should be at least 3 feet higher than the bottom of ramp elevation for the ramp to be usable. As can be seen from the information below, boat-ramp access to the reservoir becomes increasingly

limited below pool elevation 293 feet, m.s.l. An additional concern is recreational access within narrow and shallow coves in Kerr Reservoir where boating would be prohibited and some boats would be grounded.

Table Five
Public Boat Ramps at John H. Kerr Reservoir

Location	Ramps	Number of Lanes	Bottom Ramp Elevation (feet, m.s.l.)
Satterwhite Point	2	2	294
Flemingtown	1	2	293
Palmer Point	1	2	293
Clover	1	1	292
Eagle Point	1	2	292
North Bend Park	2	4	291
Steel Creek Marina	2	3	291
Staunton	1	2	291
Bullocksville	1	2	291
Hyco Landing	1	1	291
Clarksville Marina	1	2	290
Henderson Point	2	4	290
Nutbush	1	3	290
Bluestone	1	2	289
Occoneechee	3	5	289
Kimball Point	1	2	289
Grassy Creek	1	2	289
Island Creek	1	2	288
Williamsboro Wayside	1	1	288
North Bend Park Marina	1	1	286
Satterwhite Point Marina	1	2	286
Longwood	1	2	286
Eastland Creek	1	2	286
Buffalo Landing	1	2	285
Ivy Hill	1	2	285
Rudds Creek	2	3	285
County Line	1	2	285
Hibernia	2	4	285

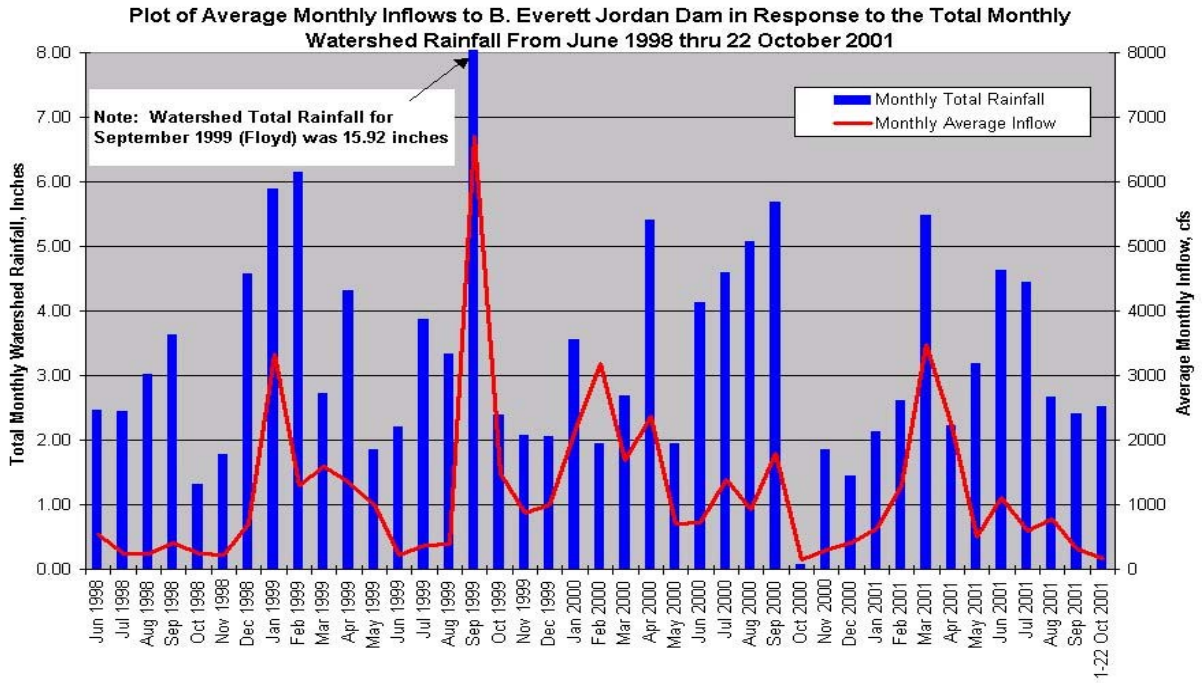
14. **Tabulated B. Everett Jordan Project Watershed Rainfall and Inflows**. Since June 1998, only 12 out of the past 41 months had above average rainfall and ten of the past 41 months had average monthly inflows greater than average. Over the past 41 months, inflows overall trended about 84 percent of average although rainfall has averaged 93 percent of normal. From a drought management view, these averages are biased by the rains received during the tropical season in 1999 when Hurricane Floyd dumped tremendous amounts of water along parts of eastern and south central North Carolina. The inflows during September 1999 were 808 percent

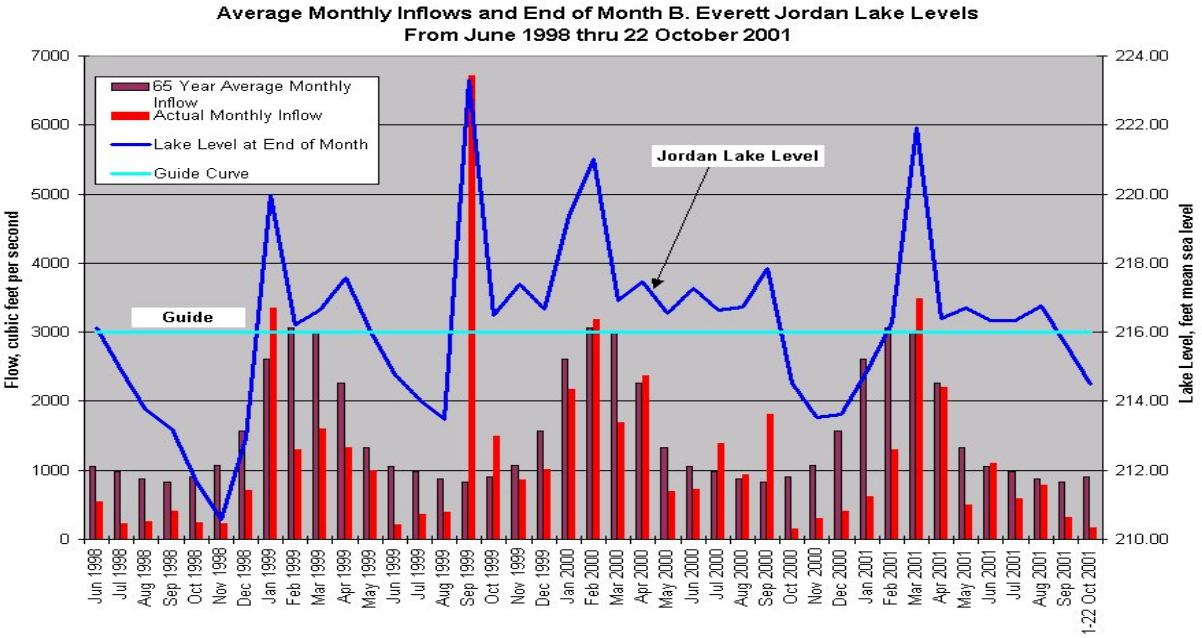
of normal. Additionally, if this month were removed from the table below, the average inflow since June 1998 into Jordan Dam would be reduced from 84 to 68 percent of normal. Note that the guide curve or target level at Jordan Lake is at elevation 216 feet, msl year round.

Table Six
B. Everett Jordan--Inflows, Rainfall, and Lake Levels
From June 1998 to Present

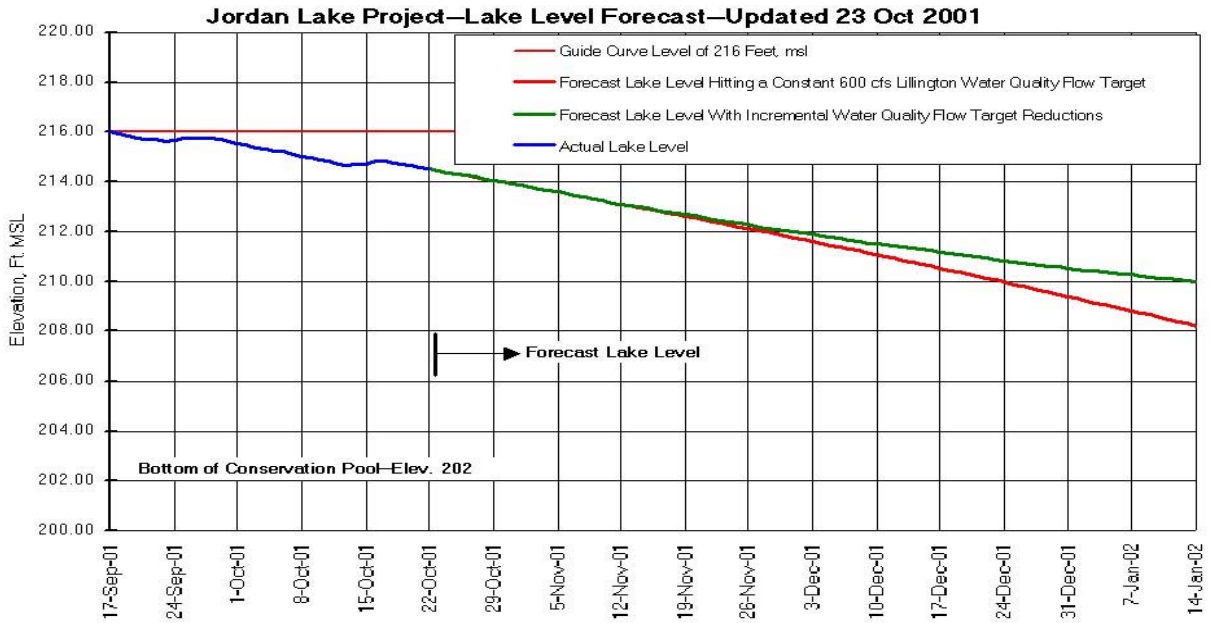
	Inflow to Jordan Dam			Watershed Rainfall			Lake Level
	Long Term Avg	Actual	Percent of Normal	Long Term Avg	Actual	Percent of Normal	End of Month Ft-msl
Jun 1998	1056	544	52	3.96	2.47	62	216.14
Jul 1998	986	233	24	4.91	2.44	50	214.90
Aug 1998	878	249	28	4.56	3.02	66	213.75
Sep 1998	830	404	49	3.52	3.63	103	213.21
Oct 1998	904	239	26	3.15	1.31	42	211.65
Nov 1998	1075	231	21	2.88	1.77	61	210.58
Dec 1998	1562	703	45	3.38	4.58	136	212.92
Jan 1999	2608	3342	128	3.67	5.88	160	219.95
Feb 1999	3058	1294	42	3.52	6.15	175	216.23
Mar 1999	3023	1597	53	3.95	2.72	69	216.65
Apr 1999	2264	1335	59	3.42	4.32	126	217.57
May 1999	1331	996	75	3.80	1.86	49	216.02
Jun 1999	1056	214	20	3.96	2.21	56	214.76
Jul 1999	986	366	37	4.91	3.87	79	214.04
Aug 1999	878	387	44	4.56	3.33	73	213.46
Sep 1999	830	6709	808	3.52	15.92	452	223.32
Oct 1999	904	1486	164	3.15	2.39	76	216.50
Nov 1999	1075	867	81	2.88	2.08	72	217.40
Dec 1999	1562	1004	64	3.38	2.06	61	216.68
Jan 2000	2608	2172	83	3.67	3.56	97	219.34
Feb 2000	3058	3177	104	3.52	1.95	55	221.01
Mar 2000	3023	1683	56	3.95	2.68	68	216.90
Apr 2000	2264	2372	105	3.42	5.41	158	217.45
May 2000	1331	695	52	3.80	1.94	51	216.56
Jun 2000	1056	718	68	3.96	4.13	104	217.27
Jul 2000	986	1392	141	4.91	4.60	94	216.65
Aug 2000	878	932	106	4.56	5.07	111	216.73
Sep 2000	830	1805	217	3.52	5.68	161	217.84
Oct 2000	904	157	17	3.15	0.07	2	214.53
Nov 2000	1075	296	28	2.88	1.86	65	213.54
Dec 2000	1562	413	26	3.38	1.45	43	213.61
Jan 2001	2608	626	24	3.67	2.13	58	214.90
Feb 2001	3058	1298	42	3.52	2.61	74	216.29
Mar 2001	3023	3485	115	3.95	5.48	139	221.91
Apr 2001	2264	2201	97	3.42	2.23	65	216.41
May 2001	1331	504	38	3.80	3.18	84	216.71
Jun 2001	1056	1107	105	3.96	4.63	117	216.35
Jul 2001	986	593	60	4.91	4.44	90	216.34
Aug 2001	878	784	89	4.56	2.67	59	216.76
Sep 2001	830	316	38	3.52	2.41	68	215.63
1-22 Oct 2001	904	170	19	3.15	2.52	80	214.51
Average	1546	1197	84	3.76	3.48	93	

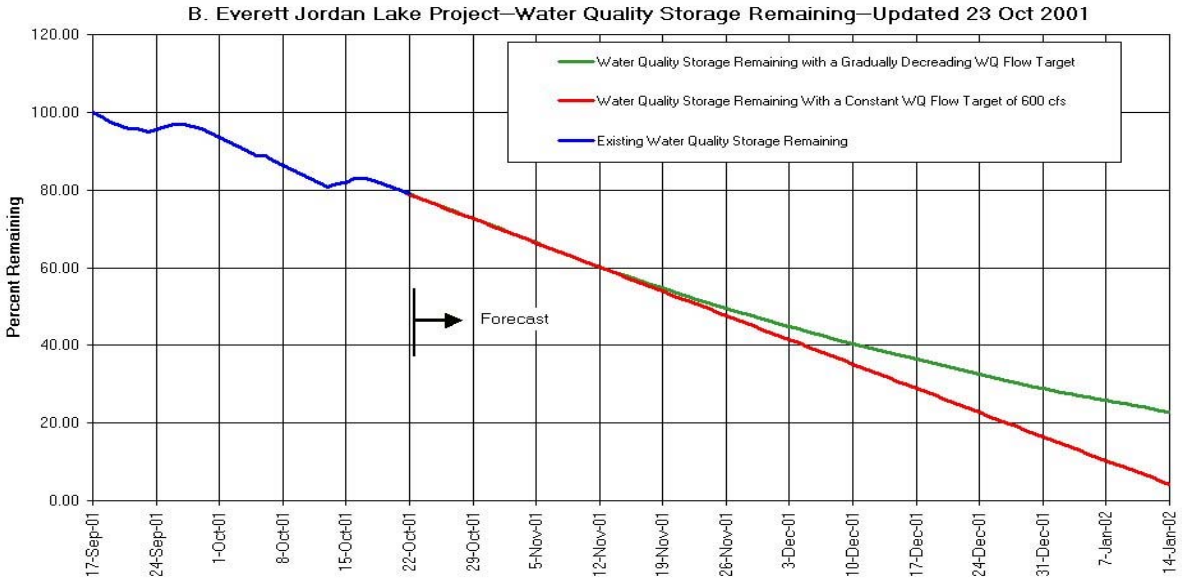
15. **Plotted B. Everett Jordan Project Watershed Rainfall, Project Inflows and End of Month Lake Level**. The plots on the following page illustrate the data in Table Six and the relationship between rainfall, resultant net inflow to Jordan Dam and the end of month Jordan Lake levels. Although the Jordan project watershed and lake level is in much better shape than the Kerr and Philpott areas, the ground water or base flow levels appear to be depressed. This is observed in Table Six and also in the plots below. For example, in June of this year, rainfall and inflows were above normal. Since then, rainfall has been below normal each month and the monthly inflows have plummeted. This is very obvious in the tabulated data.





16. **<u>Status of Jordan Lake Level, Water Quality Storage, Water Supply Storage</u>**: Conditions continue to get slowly worse for the B. Everett Jordan project. As of this report, Jordan Lake is at 214.5 feet, msl or 1.5 feet below guide curve. Recreation will decrease as the lake level decreases. However, recreation in the late fall and winter months decreases naturally. A primary concern with Jordan Lake is the status of the water quality storage portion of the conservation pool behind Jordan Dam. Water from the water quality pool is used to ensure that the Cape Fear River at Lillington is above a flow rate of 600 cfs each day of the year. If the water quality pool storage is depleted, the 600 cfs flow rate at Lillington would not be guaranteed. To help decrease the possibility of the water quality pool being depleted, the water quality flow target has been decreased in gradual steps as the drought worsened and as the water quality storage behind Jordan Dam decreased. This helped conserve the remaining storage and extended the longevity of this storage. During previous droughts, the NC Division of Water Quality closely monitored the water quality of the Cape Fear River during each cutback in target flows and partnered with the Wilmington District in this effort. The red line in the plot below shows the Jordan Lake draw down if water quality targets are not cutback. Likewise, on the following plot of water quality storage, the red line shows the water quality storage remaining if the water quality flow target is maintained at 600 cfs. In contrast, the green line on both plots shows the beneficial effects of the gradual tapering back of water quality flows. In the gradual taper back analysis, instead of hitting a flow target of 600 cfs at Lillington, the releases from Jordan Dam were limited to 500 cfs at 60 percent of water quality storage remaining, 450 cfs at 50 percent, 400 cfs at 40 percent, 350 cfs at 30 percent remaining and 300 cfs at 20 percent remaining. In this way, the flow produced at Lillington is the sum of the release of Jordan Dam and the local flows between Jordan Dam and Lillington. This local flow area includes the entire flows produced by the Deep River. The Deep River joins with the Haw River to form the Cape Fear River. With either plan, 60 percent of the water quality storage is anticipated to happen about mid-November. When this happens, notification with concerned partners will take place. The water supply storage portion of Jordan Lake is not a concern at the moment as the water supply pool is not fully allocated by the State of North Carolina.





17. <u>Impacts to Public Recreation Facilities at Jordan Lake</u>. Public recreation facilities at B. Everett Jordan Project are shown below and will be discussed more in detail as the drought continues or worsens.

Table Seven--Public Boat Ramps B. Everett Jordan Project

Location	Number of Lanes	Bottom Ramp Elevation (feet, m.s.l.)
Ebenezer	2	202
	4	206
Vista Point	2	202
	2	206
Parkers Creek	2	205
Farrington	2	202
	2	206
	2	208
Crosswinds Ramp	4	212
	2	202
Crosswinds Marina	2	202
	2	208
Poes Ridge	4	210
Poplar Point	4	210
Seaforth	3	205
	3	210
Crosswinds Campground	2	207
Robeson Creek	1	202
	1	208
New Hope Overlook	2	202
	4	208

18. **Tabulated Falls Lake Project Watershed Rainfall and Inflows**. Since June 1998, only 12 out of the past 41 months had above average rainfall and nine of the past 41 months had average monthly inflows greater than average. Over the past 41 months, inflows overall trended about 92 percent of average although rainfall has averaged 96 percent of normal. As with the Jordan project discussed earlier, the inflow averages are biased by the rains received during the tropical season in 1999 when Hurricane Floyd dumped tremendous amounts of water along parts of eastern and south central North Carolina. The inflows during September 1999 were 1477 percent of normal. Additionally, if this month were removed from the table below, the average inflow since June 1998 into Falls Dam would be reduced from 92 to 65 percent of normal. Note that the guide curve or target level at Falls Lake is at elevation 251.5 feet, msl year round.

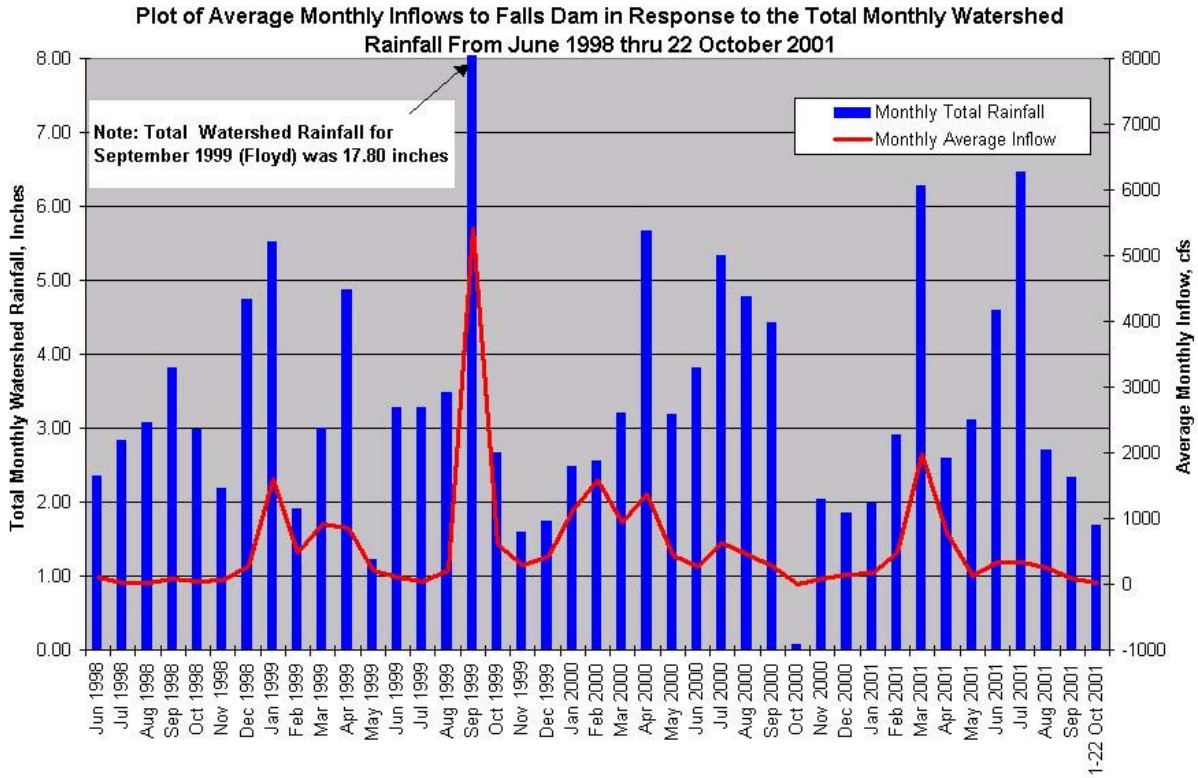
Table Eight
Falls Lake--Inflows, Rainfall, and Lake Levels
From June 1998 to Present

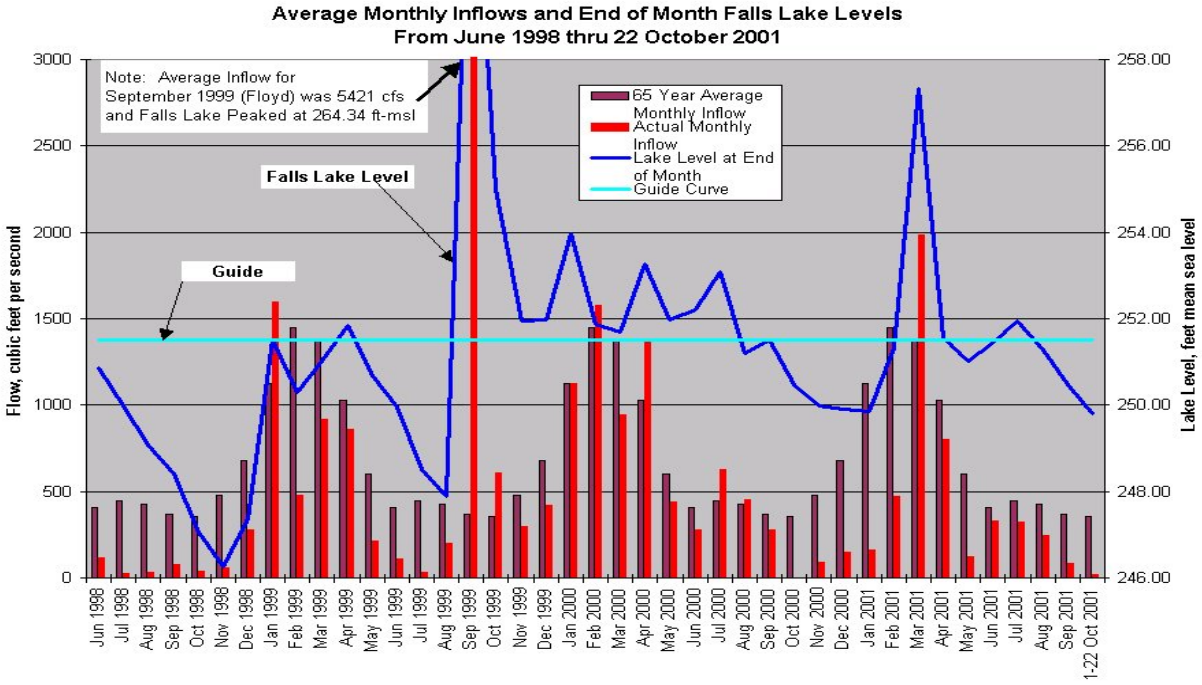
	Inflow to Falls Dam			Watershed Rainfall			Lake Level
	Long Term Avg	Actual	Percent of Normal	Long Term Avg	Actual	Percent of Normal	End of Month Ft-msl
Jun 1998	408	114	28	3.84	2.36	61	250.85
Jul 1998	445	28	6	4.83	2.83	59	249.97
Aug 1998	429	31	7	4.50	3.07	68	249.09
Sep 1998	367	80	22	3.52	3.82	109	248.40
Oct 1998	356	37	10	3.13	2.99	96	247.06
Nov 1998	480	57	12	3.16	2.19	69	246.27
Dec 1998	678	278	41	3.24	4.75	147	247.38
Jan 1999	1125	1598	142	3.64	5.51	151	251.51
Feb 1999	1449	480	33	3.43	1.90	55	250.29
Mar 1999	1371	919	67	3.99	3.00	75	251.03
Apr 1999	1031	859	83	3.39	4.87	144	251.84
May 1999	604	214	35	3.88	1.22	31	250.68
Jun 1999	408	110	27	3.84	3.28	85	249.95
Jul 1999	445	34	8	4.83	3.28	68	248.51
Aug 1999	429	201	47	4.50	3.48	77	247.90
Sep 1999	367	5421	1477	3.52	17.80	506	264.25
Oct 1999	356	607	171	3.13	2.67	85	255.00
Nov 1999	480	296	62	3.16	1.59	50	251.95
Dec 1999	678	419	62	3.24	1.74	54	251.98
Jan 2000	1125	1127	100	3.64	2.48	68	253.97
Feb 2000	1449	1579	109	3.43	2.56	75	251.86
Mar 2000	1371	941	69	3.99	3.20	80	251.69
Apr 2000	1031	1372	133	3.39	5.66	167	253.27
May 2000	604	441	73	3.88	3.18	82	251.98
Jun 2000	408	281	69	3.84	3.82	99	252.20
Jul 2000	445	630	142	4.83	5.34	111	253.09
Aug 2000	429	455	106	4.50	4.78	106	251.19
Sep 2000	367	279	76	3.52	4.42	126	251.52
Oct 2000	356	-9	-3	3.13	0.08	3	250.48
Nov 2000	480	91	19	3.16	2.03	64	249.98
Dec 2000	678	148	22	3.24	1.85	57	249.90
Jan 2001	1125	160	14	3.64	1.98	54	249.86
Feb 2001	1449	473	33	3.43	2.91	85	251.33
Mar 2001	1371	1986	145	3.99	6.28	157	257.34

Table Eight (Continued)
Falls Lake--Inflows, Rainfall, and Lake Levels
From June 1998 to Present

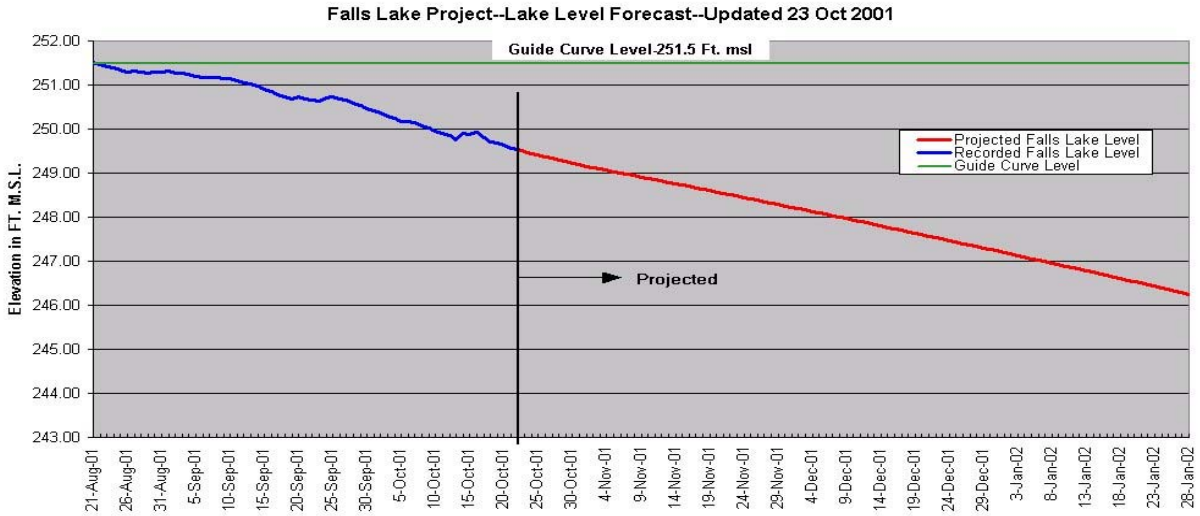
	Inflow to Falls Dam			Watershed Rainfall			Lake Level
	Long Term Avg	Actual	Percent of Normal	Long Term Avg	Actual	Percent of Normal	End of Month Ft-msl
Apr 2001	1031	799	77	3.39	2.60	77	251.57
May 2001	604	121	20	3.88	3.12	80	251.03
Jun 2001	408	332	81	3.84	4.59	120	251.43
Jul 2001	445	326	73	4.83	6.46	134	251.96
Aug 2001	429	247	58	4.50	2.71	60	251.28
Sep 2001	367	82	22	3.52	2.33	66	250.47
1-22 Oct 2001	356	17	5	3.13	1.68	54	249.54
Average	689	577	92	3.74	3.57	96	

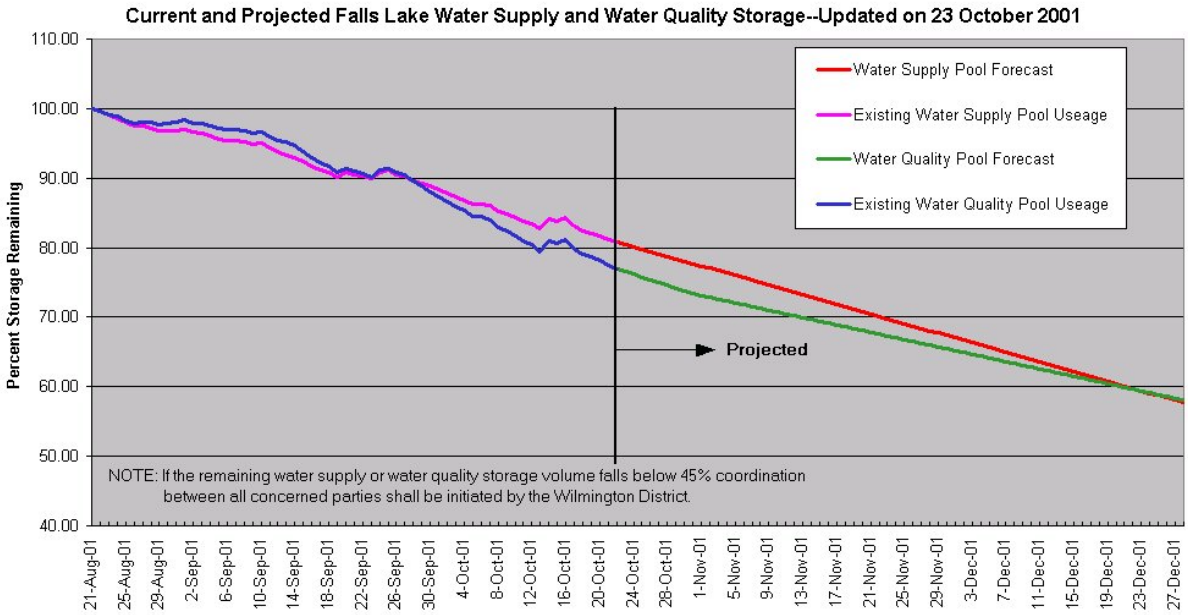
19. **Plotted Falls Lake Project Watershed Rainfall, Project Inflows and End of Month Lake Level**. The plots on the following page illustrate the data in Table Eight and the relationship between rainfall, resultant net inflow to Falls Dam and the end of month Falls Lake levels. As with the discussion earlier on the Jordan project watershed, the ground water or base flow levels appear to be depressed. This is very obvious in the tabulated data from Table Eight as the inflow percent of normal has plummeted over the past few months.





20. **<u>Status of Falls Lake Level, Water Quality Storage, Water Supply Storage</u>**: Conditions continue to get slowly worse for the Falls Lake project. As of this report, Falls Lake is at 249.7 feet, msl or 1.8 feet below guide curve. Recreation will decrease as the lake level decreases. However, recreation in the late fall and winter months decreases naturally. Both the water supply and water quality pools in Falls Lake are fully utilized and are being monitored. Fortunately, the water quality target downstream at Clayton drops from 254 cfs to 184 cfs in November and remains at that level through March. This will certainly help conserve the water quality portion of the conservation pool in Falls Lake. Warnings are issued whenever either the water quality or water supply pool falls to 45 percent of storage remaining. However, prior experiences with droughts support warnings at 60 percent of storage remaining which is not anticipated until much later in the year.





21. **Impacts to Public Recreation Facilities at Falls Lake**. Public recreation facilities at Falls Lake Project are shown below in table nine and will be discussed more in detail as the drought continues or worsens.

Table Nine--Public Boat Ramps Falls Lake Project

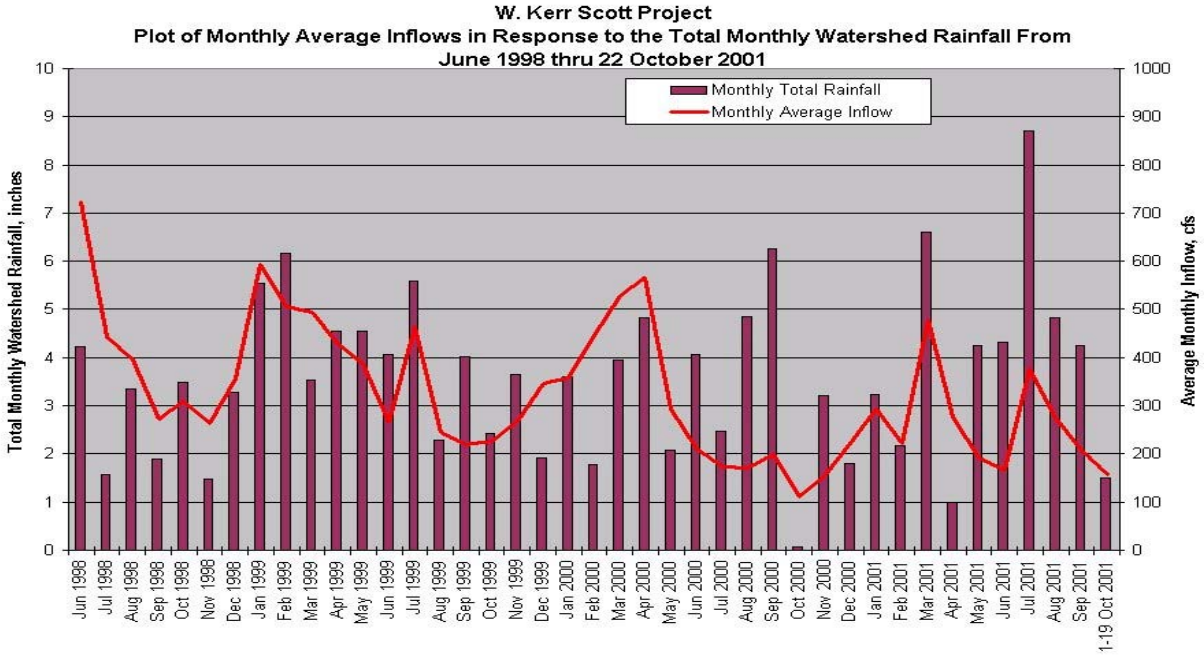
Location	Number of Lanes	Bottom Ramp Elevation (feet, m.s.l.)
Eno River Portage Area	1	242
Hickory Hill Access Area	4	232.4
Ledge Rock Access Area	4	241.6
Rolling View (Marina Area)	2	240
Rolling View (Sailing Area)	4	240
Highway 50 Recreation Area	6	232.5
Upper Barton Creek	4	235.3
BW Wells	1	236
Beaverdam Subimpoundment	2	242.5
Holly Point	2	236

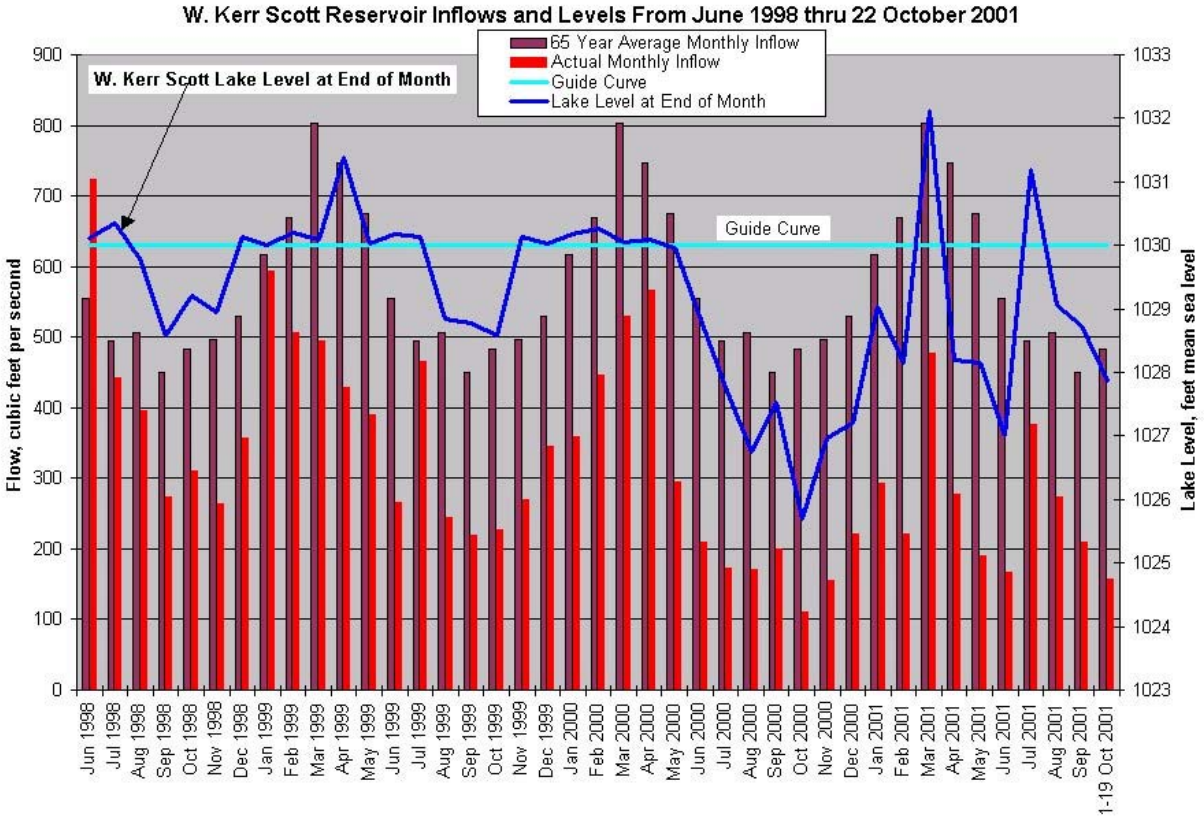
22. **Tabulated W. Kerr Scott Project Watershed Rainfall and Inflows**. The past 41 months of inflows and rainfalls to the W. Kerr Scott project are shown in table 10 on the following page. In summary, since June 1998, only eight out of the past 41 months had above average rainfall and one of the past 41 months had average monthly inflows greater than average. Over the past 41 months, inflows overall trended about 57 percent of average although rainfall has averaged 78 percent of normal. Note that the guide curve or target level at W. Kerr Scott Reservoir is at elevation 1030.0 feet, msl year round. The plan of operation for W. Kerr Scott is tailored so that the reservoir level can be recovered even during times of mild drought as shown in the table. The plan is also tailored so that even during extended droughts that the reservoir level is typically stabilized in the lower 1020's and would rarely fall below this level.

Table Ten
W. Kerr Scott Project--Inflows, Rainfall, and Lake Levels
From June 1998 to Present

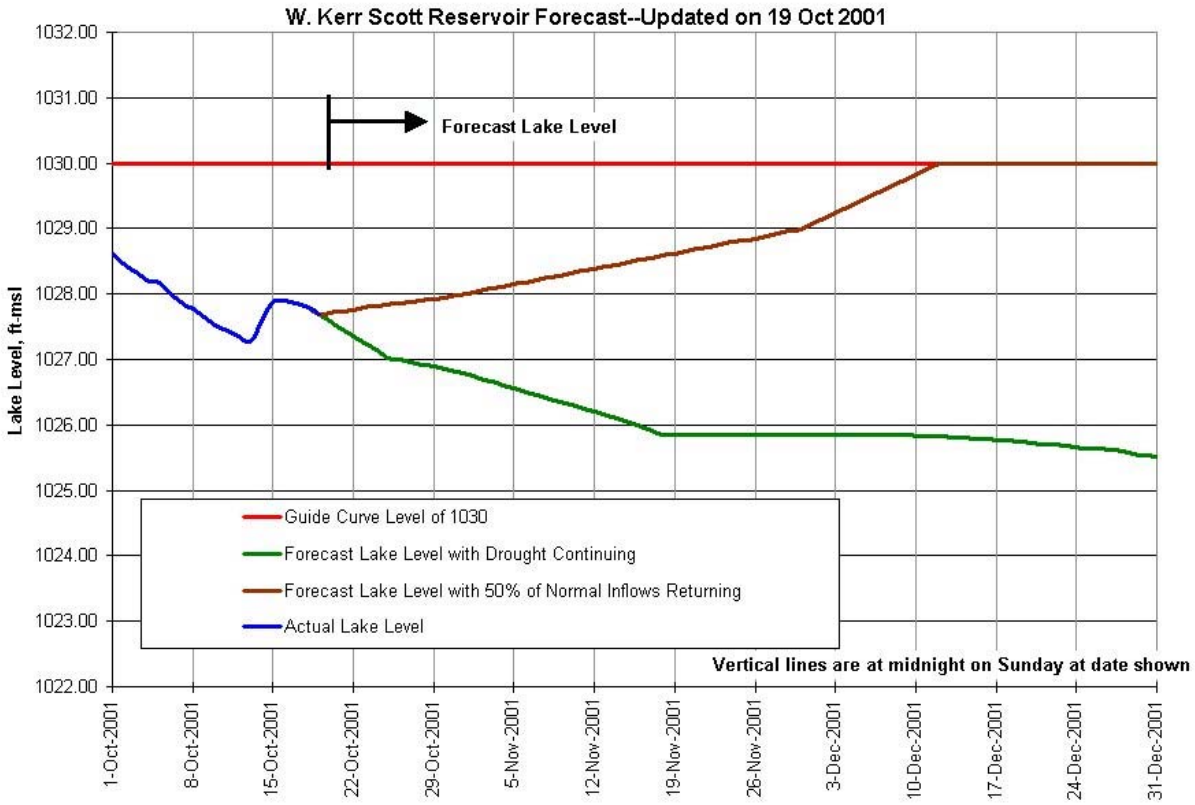
	Inflow to Scott Dam			Watershed Rainfall			Lake Level
	Long Term Avg	Actual	Percent of Normal	Long Term Avg	Actual	Percent of Normal	End of Month Ft-msl
Jun 1998	555	723	130	4.73	4.23	89	1030.11
Jul 1998	495	443	89	5.08	1.56	31	1030.34
Aug 1998	507	395	78	5.27	3.34	63	1029.78
Sep 1998	450	273	61	4.55	1.89	42	1028.58
Oct 1998	483	310	64	4.03	3.48	86	1029.21
Nov 1998	496	264	53	3.82	1.48	39	1028.94
Dec 1998	530	356	67	3.82	3.28	86	1030.13
Jan 1999	616	593	96	3.70	5.55	150	1030.00
Feb 1999	670	506	76	3.98	6.17	155	1030.20
Mar 1999	803	495	62	5.22	3.53	68	1030.09
Apr 1999	747	428	57	4.31	4.54	105	1031.39
May 1999	675	389	58	4.91	4.55	93	1030.02
Jun 1999	555	265	48	4.73	4.06	86	1030.18
Jul 1999	495	465	94	5.08	5.59	110	1030.14
Aug 1999	507	244	48	5.27	2.29	43	1028.84
Sep 1999	450	219	49	4.55	4.02	88	1028.78
Oct 1999	483	227	47	4.03	2.42	60	1028.58
Nov 1999	496	269	54	3.82	3.65	96	1030.14
Dec 1999	530	346	65	3.82	1.91	50	1030.03
Jan 2000	616	359	58	3.70	3.60	97	1030.17
Feb 2000	670	446	67	3.98	1.78	45	1030.27
Mar 2000	803	529	66	5.22	3.95	76	1030.05
Apr 2000	747	566	76	4.31	4.83	112	1030.08
May 2000	675	294	44	4.91	2.07	42	1029.96
Jun 2000	555	210	38	4.73	4.06	86	1028.88
Jul 2000	495	173	35	5.08	2.46	48	1027.77
Aug 2000	507	170	34	5.27	4.86	92	1026.75
Sep 2000	450	199	44	4.55	6.25	137	1027.52
Oct 2000	483	111	23	4.03	0.06	1	1025.69
Nov 2000	496	156	31	3.82	3.21	84	1026.97
Dec 2000	530	222	42	3.82	1.79	47	1027.20
Jan 2001	616	293	48	3.70	3.24	88	1029.03
Feb 2001	670	222	33	3.98	2.18	55	1028.15
Mar 2001	803	477	59	5.22	6.61	127	1032.12
Apr 2001	747	277	37	4.31	0.99	23	1028.19
May 2001	675	191	28	4.91	4.24	86	1028.15
Jun 2001	555	167	30	4.73	4.33	92	1027.01
Jul 2001	495	377	76	5.08	8.71	171	1031.20
Aug 2001	507	274	54	5.27	4.82	91	1029.05
Sep 2001	450	209	46	4.55	4.26	94	1028.74
1-22 Oct 2001	483	157	33	4.03	1.51	38	1027.86
Avg	569	330	57	4.42	3.40	78	

23. **Plotted W. Kerr Scott Project Watershed Rainfall, Project Inflows and End of Month Lake Level**. The plots below illustrate the relationship between reservoir level, inflow and rainfall data presented in Table 10.





24. **Status of the W. Kerr Scott Reservoir Level**: Conditions continue to be a challenge in the W. Kerr Scott area. Today, the reservoir level is near 1027.8 feet, msl and falling slowly. The plot below shows two possible avenues. The green line shows a continuation of the drought conditions. The drawdown is anticipated to flatten out as outflows are decreased with the drop in reservoir level. At one point, outflows are the same as inflows. The other line on the plot shows what might happen if 50 percent of the normal inflows return.



25. **Impacts to Public Recreation Facilities at W. Kerr Scott Reservoir**. Public recreation facilities at W. Kerr Scott Reservoir are shown below in table eleven and will be discussed more in detail as the drought continues or worsens.

Table Eleven--Public Boat Ramps Falls Lake Project

Location	Number of Lanes	Bottom Ramp Elevation (feet, m.s.l.)
Dam Site Park	1	1015
Marina	2	1015
Bandits Roost Park	1	1015
Boomer Park	1	1016
Keowee Park	1	1015
Wilkes County Park	2	1015
Smitheys Creek Park	1	1015